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LORAIN

Products Corporation

instructions

INSTALLATION

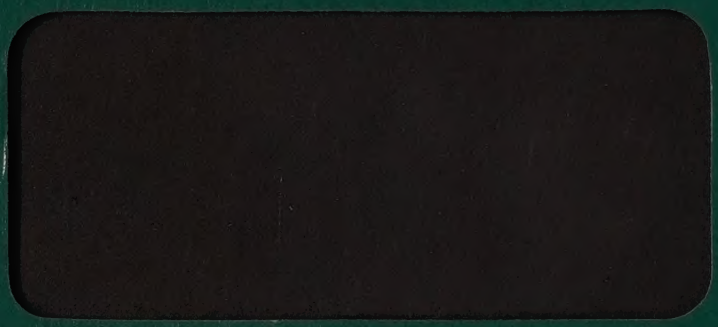
OPERATION

MAINTENANCE

DESIGNERS AND MANUFACTURERS OF

power equipment without moving parts

SUB-CYCLE® CONVERTERS AND FLOTROL RECTIFIERS



For Parts Or Service, Contact:

Lorain Products Corporation
Service Department
1122 "F" Street
Lorain, Ohio 44052
PH: (216) 288-1122
TWX: 810-426-2130

NOTE

PROGRAMMED PREVENTIVE MAINTENANCE Is Available On This And Other Lorain Products Manufactured Equipment. For Further Information, Contact "Service Manager" At The Above Address.

LORAIN
20BI
POWER UNIT

SPEC. NO. 5777-002 SERIAL NO. _____

LORAIN PRODUCTS CORPORATION
1122 F STREET LORAIN, OHIO

LORAIN PRODUCTS CORPORATION WARRANTY

Lorain Products Corporation warrants that all equipment manufactured by it shall be free from defects in material and workmanship. The corporation will, at its option, replace or repair free of charge and pay surface carrier charges on any adequately packed equipment covered by its warranty which shall be returned to the factory within 90 days from date of turn-on and found to be defective. All circuit components are warranted for two years from the original shipping date from the factory and which upon examination prove to be defective in material or workmanship. The corporation recommends that all shipments of equipment be inspected by the customer for hidden damage upon receipt from the carrier to insure that a timely claim be filed, if necessary, by the customer. Lorain Products Corporation will not pay claims for shipping damages.

Systems and Equipment Not Economically Returnable To The Factory

In the event that the product involved is a system or equipment which, in the judgment of Lorain Products Corporation, is not economically returnable to the factory or if Lorain Products Corporation has performed the installation, supervised the installation, or performed testing and turn-on, circuit components and Lorain repair labor are covered by this warranty for the first 90 days from date of turn-on and circuit components are warranted for two years from the date of shipment. Upon request, Lorain will send a service technician to the site to determine if the unit is defective in circuit components or workmanship, and will repair the equipment. If the failure is Lorain's fault, no invoice for circuit components or repair labor will be issued if the complaint has been issued within the first 90 days from date of turn-on. If the complaint is issued more than 90 days from the date of turn-on but within two years from the date of shipment, the customer will be billed at the prevailing Customer Service rates but will not be billed for circuit components. If the problem occurs after two years from the date of shipment, circuit components and repair labor are billable.

If the problem has been created by misuse or abuse of the equipment or by malfunction of associated equipment or by environmental conditions, at any time after shipment, the customer will be billed for circuit components and labor.

General Provisions

Lorain Products Corporation shall not be obligated to pay any costs or charges incurred by the customer or by any other party. In no event will Lorain Products Corporation be liable for consequential damages. No waiver, alteration or modification of any of the provisions herein shall be binding on Lorain Products Corporation unless in writing and signed by an authorized official of Lorain Products Corporation. If, during any warranty period, the subject equipment has, in the opinion of Lorain Products Corporation, been modified or misrepaired, the warranty will be void unless the modifications or repairs have been made after consultation with the corporation and upon the recommendation of the corporation.

INSTRUCTIONS
LORAIN MODEL 20B1 POWER UNIT
SD-1769-02

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INSTRUCTIONS
LORAIN MODEL 20B1 POWER UNIT
SD-1769-02

1. RATINGS

Input: 115 volt, 60 cycle, single phase a-c, 20 amperes

Ringing Output: 90 or 110 volt 20 cycle a-c; 15 watts

Tone Output: Two isolated windings provide 8 volt center tapped, and 0.5 to 10.5 volts of tone current, 600 cycle modulated at 120 cycle low-level output; 100 milliwatts

D-c Output: Regulated 50 volt d-c, adjustable between 46 to 56 volts, 20 amperes

Interrupter (Accessory):

Ringing: One second ringing interval with three second interruption period

Tone: 60 IPM
120 IPM

Ground Pulse Outputs: 15 IPM (0.25 second pulse)
30 IPM (0.25 second pulse)
120 IPM (0.25 second pulse)
60 IPM (0.50 second pulse)

2. DESCRIPTION

a. D-c Supply

D-c output voltage is continuously adjustable from 46 to 56 volts. Once adjusted, d-c output voltage is maintained constant within plus-or-minus 1% at any output current between zero to full-load despite plus-or-minus 10% variation of a-c power voltage, and despite a plus-or-minus 3 cps variation of a-c input frequency.

The filtered d-c output can either be used to charge a battery or can be supplied directly to load in a batteryless installation. This d-c supply circuit is self-protected against overload. In event of overload, an output current limiter decreases d-c output voltage as necessary to prevent increase of d-c output current to an excessive value.

2. a. (continued)

The d-c supply has a circuit which monitors output voltage continuously, and shuts off d-c output current if output voltage reaches a preset value. High voltage shutdown is adjusted at the factory to 60 volts, unless otherwise specified. If the d-c supply is to be used as a battery eliminator, the high voltage shutdown circuit should be set for 70 volts. Before the d-c supply is used as a battery eliminator, the setting of the high voltage shutdown circuit should be checked and readjusted if necessary. Refer to paragraph 4 f, below.

A voltmeter and an ammeter indicate d-c output voltage and output current.

Provision is made for an external alarm to be extended in event of a-c power failure.

If d-c requirements of a telephone system should exceed 20 amperes, a similar d-c supply in another LORAIN Model 20B1 Power Unit can be connected to operate in parallel with this d-c supply.

b. Ringing Generator Assembly

Ringing current is furnished by a 1481AS Ringing Generator Assembly, which produces 20 cps alternating current from 50 volt d-c. Either 90 volt or 110 volt ringing current can be selected by means of a customer adjustment. This ringing generator assembly can be replaced as a unit.

c. Tone Generator Assembly

A 1482AS Tone Generator Assembly produces tone current from 50 volts d-c. Tone current can be supplied directly as dial tone signal and, when interrupted, it can be used as busy signal or as all-trunks-busy signal. Two separate tone output circuits supply 8 volt center-tapped and 0.5 to 10.5 volt tone current. Customer adjustments set tone voltage level supplied by each tone output circuit: see 4 (e) for tone level adjustment connections. This tone generator assembly can be replaced as a unit.

d. Accessories

The following accessories are factory-installed when specified, and are also available for customer installation:

(1) A LORAIN 1468AS Interrupter Assembly can be furnished to interrupt tone current and ringing current and to furnish ground pulse signals.

2. d. (2) Either one of the following alarm accessories can be provided to indicate a specific alarm condition:

(a) A 291K Charge Failure Alarm Relay Assembly can be installed to provide for an alarm in the event of d-c supply current failure.

(b) A 4863-040 High-Low Voltage Alarm Relay Assembly can be installed to give an alarm in the event the d-c output voltage goes above or below preset levels.

3. INSTALLATION

a. Mounting

Net Weight: 175 lbs.

LORAIN Model 20B1 Power Unit can be mounted in a twenty-three inch relay rack. It requires 22-1/4 inches panel space, extends a maximum of 11-1/16 inches to rear of rack, and has overall depth of 12 inches.

CAUTION: In mounted position, vent openings at top and bottom of LORAIN Power Unit must be unobstructed. The temperature of the air entering the bottom of the cabinet should not be allowed to exceed 50°C. This is essential to proper cooling during operation.

b. Preliminary Adjustment

Check setting of input a-c voltage range adjustment and reset if necessary. Refer to paragraph 4 b, below.

c. D-c Output Lead Requirements

D-c output voltage of this LORAIN Power Unit is maintained constant at its d-c output terminals. However, d-c voltage supplied to battery or power board will be decreased by any voltage drop in d-c output leads. Hence, it is desirable to minimize this voltage drop. Output wire sizes indicated on the Installer's Connection Sheet of the Wiring Diagram will limit output lead voltage drop to 1% of d-c output voltage, at rated output current of 20 amperes, so long as output loop length does not exceed maximum specified above each wire size.

3. d. Electrical Connections

To gain access to installer connection terminals, release four twist-type fasteners and remove rear cover from Power Unit.

As viewed from rear of Power Unit, input and output terminal blocks are located at upper left side. Electrical lead entrance is by means of three adjacent insulator bushings at top of cabinet: if desired, the a-c input and d-c output bushings can be replaced with standard 1-1/4 inch conduit fittings, the alarm and tone bushing can be replaced with a 3/4 inch conduit fitting.

CAUTION; Before making any electrical connections, be certain that input circuit breaker CB1 is thrown to the OFF position.

(1) D-c Output

Bring d-c output leads through output bushing and connect at OUTPUT terminal block as indicated by polarity markings. OUTPUT terminal block capacity is given on the Installer's Connection Sheet of the Wiring Diagram.

(2) A-c Input

Bring single-phase a-c power leads through input bushing and connect at INPUT terminal block. Recommended size of input leads, a-c branch circuit fusing, and INPUT terminal block capacity are given on Installer's Connection Sheet of the Wiring Diagram furnished in this instruction book.

NOTE: Grounded a-c power lead should be connected to a-c input terminal GRD. This will cause input breaker CB1 to be connected in series with the ungrounded a-c power lead.

(3) Tone, Ringing and Ground Pulse Output Connections

Connect tone, ringing, and ground pulse load at terminals of terminal strip TB7 as shown on the Installer's Connection Sheet of the Wiring Diagram.

(4) Power Failure Alarm

This Power Unit provides for an external alarm to be given in event of an a-c power failure. Terminals 4 to 5 of terminal block

3. d. (4) (continued)

TB3 can be connected to operate a closed circuit actuated alarm; terminals 5 to 6 of TB3 can be connected to operate an open circuit actuated alarm.

(5) Fuse Alarm

Terminal 12 of TB7 can be connected to operate an external alarm in event one of fuses F4, F5, F6 or F7 open. Terminal 13 of TB7 can be connected to operate an external alarm in event output fuse F1 opens.

NOTE: If the d-c supply is used as a battery eliminator, a fuse alarm will only be extended if another d-c supply is operated in parallel.

(6) Accessory Alarm Relay Connections

If furnished, a Charge Failure Alarm or High-Low Voltage Alarm Relay actuates closed circuits across terminals 3 and 4 and terminals 6 and 7 of terminal strip TB5 and open circuits across terminals 4 and 5 and terminals 7 and 8 in the event of a specific output failure.

(7) D-c Supply Paralleling

The d-c supply of this Power Unit is equipped with an automatic current limiting circuit. This circuit will enable the d-c supply to be paralleled with another d-c supply which can be adjusted to the same output voltage. The load may not be shared proportionally, but when the d-c supply reaches its current limit setting, it will not deliver further current and any additional load must be supplied by the other paralleled supplies.

(8) Installation Check

(a) To turn on LORAIN Power Unit, throw toggle of input circuit breaker CB1 to the ON position. Note d-c output voltage and d-c output current, as indicated by voltmeter and ammeter of Power Unit.

(b) Check settings of d-c output voltage, ringing voltage, and tone level adjustments. Reset, if necessary. Refer to paragraph 4 c through e, below.

4. ADJUSTMENT

a. General

The d-c supply output voltage of this LORAIN Power Unit is adjusted by potentiometer R2 on its front panel. To gain access to installer connections, release four cover fasteners and remove cover from rear of LORAIN Power Unit.

b. Input Voltage Range

This adjustment is made by connection of an adjustment lead at one of two terminals of terminal block TB4 on rear panel of Power Unit. D-c output voltage may not be properly regulated and signalling voltages may not be correct, unless input voltage range setting is correct.

(1) If possible, determine range over which a-c service voltage varies. One of two possible input voltage range settings will usually be best suited to prevailing a-c service voltages.

(2) Select necessary input voltage range by connection of adjustment lead at terminal block TB4 as follows:

Input Voltage Range	TB4 Adjustment Connection
100 to 120	terminal 110
110 to 130	terminal 120

c. D-c Supply Output Voltage

VOLT. ADJ potentiometer R2 adjusts d-c supply output voltage between 46 and 56 volts. To increase d-c supply output voltage, turn R2 screwdriver adjustment shaft clockwise; to decrease d-c output voltage, turn shaft counter-clockwise.

d. Ringing Voltage

The 1481AS ringing generator output voltage is adjusted at the factory at 90 volts unless otherwise specified. If 110 volt output is desired, it will be necessary to remove 1481AS Ringing Generator Assembly from the Power Unit (refer to paragraph 6 a) before readjustment can be made.

Ringing voltage is selected by connection of a white-blue adjustment lead on transformer T1 in the 1481AS assembly at terminal 4 for a nominal 90 volt output or terminal 5 for a nominal 110 volt output.

4. e. Tone Level Adjustment

The tone level voltage of the 1482AS Tone Generator is adjusted at the factory at 4.5 volts unless otherwise specified. If a different tone level voltage is desired, it will be necessary to remove the 1482AS Tone Generator Assembly from the Power Unit (refer to paragraph 6 b) before readjustment can be made.

Tone output voltage can be adjusted by connection of blue and white-blue adjustment leads at two of terminals 6 through 10 on transformer T1 of the 1482AS assembly as follows:

Tone Level Voltage	T1 Transformer Terminals
0.5	6, 7
1.0	7, 8
1.5	6, 8
3.0	8, 9
4.0	7, 9
4.5	6, 9
6.0	9, 10
9.0	8, 10
10.0	7, 10
10.5	6, 10

f. High Voltage Shutdown Circuit Adjustment

This adjustment sets value at which the D-c Supply will turn off if output voltage reaches a preset value. High voltage shutdown is adjusted at the factory to 60 volt d-c, unless otherwise specified. If the d-c supply is to be used as a battery eliminator and no high voltage shutdown value specified, the high voltage shutdown circuit is factory adjusted at 70 volts. The factory adjustment setting is probably correct. Use the following procedure should it be necessary to change this setting:

NOTE: If this D-c Supply is used as a battery charger, be sure to disconnect battery from output terminals before making this adjustment. Before readjustment is attempted, operate the D-c Supply for about 5 minutes.

(1) Adjust R23, located on the control unit, fully clockwise.

(2) Adjust output voltage by means of output voltage adjustment potentiometer R2 to the desired shutdown voltage.

4. f. (continued)

(3) Apply 10% load, slowly turn adjustment screw of R23 in a counter-clockwise direction until high voltage shutdown occurs. Note output voltage at which the high voltage shutdown occurs. If shutdown occurs at a lower value than desired, turn R23 potentiometer slightly clockwise; turn output voltage adjust potentiometer R2 fully counter-clockwise and circuit breaker CB1 to "Off" and back to "On" position to reset relay K1. Slowly increase output voltage by means of R2 and note value when shutdown occurs. Repeat this process until the desired shutdown voltage is reached.

g. Manufacturer Adjustments

Special manufacturer adjustments are made on each Power Unit. It is recommended that no change be made in these adjustment settings:

(1) D-c Supply

(a) Potentiometer R3 sets range over which output voltage potentiometer will adjust the output voltage.

(b) Potentiometer R9, located on the control unit, is adjusted to prevent a hunting condition (oscillation of output voltage or output current) under adverse operating conditions.

(c) Potentiometer R403 on plug-in card A4 sets value of output current beyond which an output current limiter will prevent further increase of output current. Potentiometer R403 is factory-adjusted to limit output current to 22 amperes.

(2) Tone Generator

Setting of potentiometer R3 in 1482AS Tone Generator establishes frequency of 120 cycle signal which modulates 600 cycle signal to produce tone current.

Tap connections are made to primary windings of output transformer T1 in 1482AS Tone Generator to determine frequency of 600 cycle signal modulated by 120 cycle signal to produce tone current.

5. OPERATION

a. General

Since this Power Unit operates without moving parts, it does not require periodic maintenance or adjustment. Operating procedures are described below.

5. b. Starting and Stopping

To turn LORAIN Power Unit on or off, throw toggle of circuit breaker CB1 to ON position or OFF position.

c. Metering

D-c output voltage and output current are indicated by a voltmeter and an ammeter.

d. Alarm Indication

A Charge Failure Alarm Relay Assembly, if furnished, causes lamp RECT FAIL to light, and can be connected to give an external alarm, in event of d-c output current failure or a-c power failure. Under normal operating conditions, the Charge Failure Alarm Relay is operated and no alarm is given. The Charge Failure Alarm Relay will remain operated until the output current drops below 2% of the rated D-c Supply output current When output current increases to 4% of rated value, Charge Failure Alarm Relay operates, turning off lamp RECT FAIL and external alarms.

If this Power Unit is not equipped with a Charge Failure Alarm Relay but is equipped with one of the other alarm accessories listed in paragraph 2 d (2), this accessory can be connected to extend an external alarm in event of a specific output failure.

e. High Voltage Shutdown

The d-c supply of this Power Unit has a circuit which monitors the output voltage continuously, and shuts off the d-c output current if output voltage reaches a preset value. To restore operation of the D-c Supply once shutoff has occurred, throw A-C INPUT circuit breaker first to OFF position, wait a minimum of two seconds, then return it to the ON position. Repeated shutoff indicates a failure which causes excessive d-c output voltage.

f. Circuit Breakers, Fuses

(1) Circuit Breakers

INPUT circuit breaker CB1 protects against excessive a-c input. Opening of circuit breaker is reflected by movement of its toggle from ON position to OFF position; to reset the circuit breaker, throw toggle to ON position.

(2) Fuses

All fuses except F1 are located on control panel. Fuse F1 is located behind the rear cover. If necessary to replace any fuse, replace only with fuse type and size indicated below, or equivalent:

F1: Bussmann type BAF, 25 ampere
F2: Bussmann type AGC, 1 ampere
F3, F4, F6, F7: Type 70A, 1-1/3 ampere
F5: Type 70F, 1/4 ampere

6. PLUG-IN ASSEMBLIES

a. 1481AS Plug-in Ringing Generator Assembly

This assembly is located at lower left corner of rear component panel as viewed from rear. To replace this assembly, unthread captive screw at lower portion of assembly, pull assembly outward on its guide brackets and remove assembly from Power Unit. Follow reverse procedure for installing replacement assembly.

b. 1482AS Plug-in Tone Generator Assembly

This assembly is located near lower right corner of rear component panel as viewed from rear. To replace this assembly, pull assembly out and plug in another tone generator assembly.

c. 1499AS Plug-in Control Unit

This assembly is located near bottom center of rear component panel as viewed from rear. To replace any of the associated printed circuit cards in event of failure of some component on a printed circuit card, withdraw particular card from its mounting socket and insert replacement card.

Circuit Card	Description
A1	Regulator circuit
A2	Pulse amplifier
A3	High voltage shutdown circuit
A4	Regulator power supply and current limiting circuit
A5	Auxiliary power supply
A11	Accessory charge failure alarm circuit
A12	Accessory low voltage alarm circuit
A13	Accessory high-low voltage alarm circuit

d. 1468AS Plug-in Interrupter Assembly (Accessory)

A 1468AS Plug-in Interrupter Assembly can be installed as an accessory. If supplied, this assembly is located at lower right corner of rear component panel as viewed from rear. To replace assembly, unthread two captive screws of assembly and pull assembly outward from Power Unit. Follow reverse procedure for installing replacement assembly.

6. d. (continued)

When the Interrupter is not furnished as a part of the Power Unit, a male plug with internal jumpers is used in its place. If the Interrupter is to be installed at a later date, it will be necessary to remove this male plug in order to plug in the Interrupter.

e. Alarms (Accessory)

One of the following three types of alarms may be used with this power unit: Charge Failure Alarm Relay Assembly (291K) composed of a component board assembly (1451AS) and a relay (314KA), or High-Low Voltage Alarm Relay Assembly (4863-040) composed of a component board assembly (4337-616) and a relay (288KA). If one of these alarms is furnished, the component board assembly for that alarm is located adjacent the component board assemblies of the plug-in control unit assembly in the extreme right hand receptacle as viewed from the rear. The corresponding relay is located in relay socket K3 to the right of relay K1 on the plug-in control unit, as viewed from the rear. To replace either the component board assembly or the relay, pull out the unit to be replaced and plug in the replacement.

LORAIN PRODUCTS CORPORATION
Lorain, Ohio, U.S.A.

LORAIN PRODUCTS (CANADA) LTD.
St. Thomas, Ontario, Canada

October 20, 1969

RECOMMENDED SPARE PARTS LIST
LORAIN MODEL 20B1 POWER UNIT
SPEC. NO. 5777-002

This Recommended Spare Parts List is arranged alphabetically by part name. Spare parts are not usually required if adequate standby equipment is available and if the LORAIN equipment is installed at an accessible location so that parts can readily be obtained from Lorain Products stock. When ordering parts, please furnish equipment Model No., Spec. No., and Serial No. as given on the equipment nameplate. If two asterisks (**) appear, refer to the Recommended Spare Parts List for that accessory.

LPC Part Number	Description	Quantity Recm. Spares Minimum Level	On-Site Level	Depot Level
ACCESSORIES				
4846-092	Charge Failure Alarm Relay Assembly	-	**	**
4863-040	High/Low Voltage Alarm Assembly	-	**	**
4872-803	Interrupter Assembly	-	**	**
ASSEMBLIES				
4336-010	Component PW Board	-	1	1
4337-011	High Voltage Shutdown PW Board	-	1	1
4338-006	Component PW Board	-	1	1
4865-704	Regulator Power Supply PW Board	-	1	1
4865-713	Circuit Card PW Board	-	1	1
4871-012	Ringing Generator Plug-in	-	1	1
4871-321	Oscillator PW Board	-	1	1
CAPACITORS				
2713-198	2UF 100 Volt DC	-	1	1
2715-272	1UF 200 Volt DC	-	1	1
2731-133	50UF 50 Volt, Electrolytic	-	-	-
2731-144	100UF 15 Volt, Electrolytic	-	-	-
2731-264	2000UF 6 Volt, Electrolytic	-	-	-
2731-324	8500UF 75 Volt, Electrolytic	-	-	-
CIRCUIT BREAKERS				
2567-068	25 Amp 120 Volt AC	-	1	1

RECOMMENDED SPARE PARTS LIST
LORAIN MODEL 20B1 POWER UNIT
SPEC. NO. 5777-002

LPC Part Number	Description	Quantity Recm. Spares Minimum Level	On-Site Level	Depot Level
FUSES				
2483-222	1 Amp, Cartridge	3	3	3
2483-442	25 Amp, Cartridge	3	3	3
2486-202	0.25 Amp, Alarm	3	3	3
2486-208	1.33 Amp, Alarm	6	6	6
MAGNETIC UNITS				
4415-011	DC Filter Inductor	-	-	1
4432-511	Filter Choke	-	-	1
4441-306	Power Transformer	-	-	1
4467-517	Power Transformer	-	-	1
4472-506	Auxiliary Transformer	-	-	1
METERS				
2923-210	0-30 Ammeter, DC	-	-	1
2943-211	0-80 Voltmeter, DC	-	-	1
RELAYS				
2543-015	12 Volt DC	-	1	1
2543-797	48 Volt DC	-	1	1
RESISTORS				
2615-217	12 Ohm 0.5 Watt, Fixed	-	1	1
2651-346	4K Ohm 3 Watt, Fixed	-	1	1
2651-526	300 Ohm 6.5 Watt, Fixed	-	1	1
2651-720	125 Ohm 5 Watt, Fixed	-	1	1
2651-735	1K Ohm 5 Watt, Fixed	-	1	1
2652-342	2.25K Ohm 10 Watt, Fixed	-	1	1
2652-348	5K Ohm 10 Watt, Fixed	-	1	1
2656-336	7.5K Ohm 5 Watt, Fixed	-	1	1
2656-610	100 Ohm 50 Watt, Fixed	-	1	1

RECOMMENDED SPARE PARTS LIST
LORAIN MODEL 20B1 POWER UNIT
SPEC. NO. 5777-002

LPC Part Number	Description	Quantity Recm. Spares Minimum Level	On-Site Level	Depot Level
RESISTORS (CONT'D)				
2682-202	0.07 Ohm 90 Watt, Adjustable	-	1	1
2683-235	50 Ohm 2 Watt, Potentiometer	-	1	1
2683-255	500 Ohm 2 Watt, Potentiometer	-	1	1
2683-258	750 Ohm 2 Watt, Potentiometer	-	1	1
2683-268	2.5K Ohm 2 Watt, Potentiometer	-	1	1
2683-275	5K Ohm 2 Watt, Potentiometer	-	1	1
SEMICONDUCTORS				
2416-221	Surge Suppressor	-	1	1
2812-223	1N5059, Silicon Diode	-	2	2
2813-761	1N1190A, Silicon Diode	-	1	1
2813-762	1N1190RA, Silicon Diode	-	1	1
2848-162	25 Amp, PNP, Transistor	-	2	2
2863-023	35 Amp 300 Volt, Thyristor	-	2	2
SWITCHES				
2513-126	Toggle, SPST	-	-	1
2528-107	Ring, Locking	-	-	1
MISCELLANEOUS				
2486-310	Designation Pin, Violet	-	-	1
2486-322	Designation Pin, White	-	-	1
2488-106	Fuseholder	-	-	1
2488-130	Fuseholder	-	-	1
2488-256	Fuse Block	-	-	1

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LORAIN PRODUCTS (CANADA) LTD.
St. Thomas, Ontario, Canada

SAK

Printed in U.S.A.

RECOMMENDED SPARE PARTS LIST
LORAIN 4846-092 CHARGE FAILURE ALARM RELAY ASSEMBLY

This Recommended Spare Parts List is arranged alphabetically by part name. Spare parts are not usually required if adequate standby equipment is available and if the LORAIN equipment is installed at an accessible location so that parts can readily be obtained from Lorain Products stock. When ordering parts, please furnish equipment Model No., Spec. No., and Serial No. as given on the equipment nameplate.

LPC Part Number	Description	Quantity Recm. Spares Minimum Level	On-Site Level	Depot Level
ASSEMBLIES				
4337-012	Component PW Board	-	1	1
RELAYS				
2543-137	12 Volt DC	-	1	1

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LORAIN PRODUCTS (CANADA) LTD.
St. Thomas, Ontario, Canada

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RECOMMENDED SPARE PARTS LIST
LORAIN 4863-040 HIGH/LOW VOLTAGE ALARM ASSEMBLY

This Recommended Spare Parts List is arranged alphabetically by part name. Spare parts are not usually required if adequate standby equipment is available and if the LORAIN equipment is installed at an accessible location so that parts can readily be obtained from Lorain Products stock. When ordering parts, please furnish equipment Model No., Spec. No., and Serial No. as given on the equipment nameplate.

LPC Part Number	Description	Quantity Recm. Spares Minimum Level	On-Site Level	Depot Level
ASSEMBLIES				
4337-616	Component PW Board	-	1	1
RELAYS				
2543-797	48 Volt DC	-	1	1

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RECOMMENDED SPARE PARTS LIST
LORAIN 4872-803 INTERRUPTER ASSEMBLY

This Recommended Spare Parts List is arranged alphabetically by part name. Spare parts are not usually required if adequate standby equipment is available and if the LORAIN equipment is installed at an accessible location so that parts can readily be obtained from Lorain Products stock. When ordering parts, please furnish equipment Model No., Spec. No., and Serial No. as given on the equipment nameplate.

LPC Part Number	Description	Quantity Recm. Spares Minimum Level	On-Site Level	Depot Level
ASSEMBLIES				
4337-610	Interrupter PW Board	-	1	1
4337-625	PW Board No. 1	-	1	1
CAPACITORS				
2731-147	100UF 25 Volt, Electrolytic	-	-	-
MAGNETIC UNITS				
4447-613	Output Transformer	-	-	1
RELAYS				
2543-797	48 Volt DC	-	1	1
RESISTORS				
2652-321	150 Ohm 10 Watt, Fixed	-	1	1
2656-511	100 Ohm 25 Watt, Fixed	-	1	1
SEMICONDUCTORS				
2813-133	1N1200A, Silicon Diode	-	2	2
2848-059	2N1536, Transistor	-	2	2

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Lorain, Ohio, U.S.A.

LORAIN PRODUCTS (CANADA) LTD.
St. Thomas, Ontario, Canada

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FIG. 1

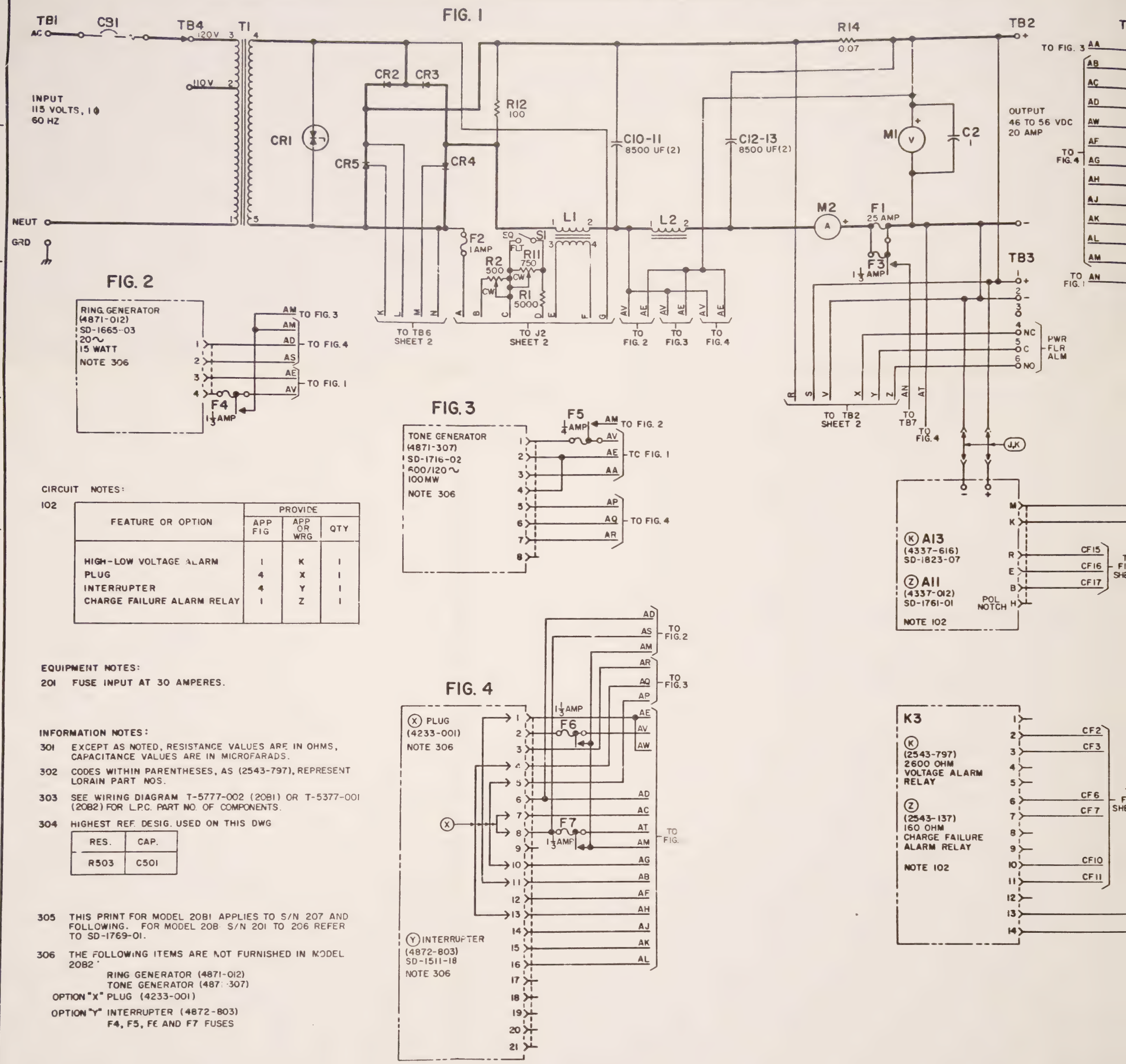

FIG. 2

FIG. 3

FIG. 4

CIRCUIT NOTES:

102

FEATURE OR OPTION	PROVIDE		
	APP FIG	APP OR WRG	QTY
HIGH-LOW VOLTAGE ALARM	1	K	1
PLUG	4	X	1
INTERRUPTER	4	Y	1
CHARGE FAILURE ALARM RELAY	1	Z	1

EQUIPMENT NOTES:

201 FUSE INPUT AT 30 AMPERES.

INFORMATION NOTES:

301 EXCEPT AS NOTED, RESISTANCE VALUES ARE IN OHMS, CAPACITANCE VALUES ARE IN MICROFARADS.

302 CODES WITHIN PARENTHESES, AS (2543-797), REPRESENT LORAIN PART NOS.

303 SEE WIRING DIAGRAM T-5777-002 (2081) OR T-5377-001 (2082) FOR L.P.C. PART NO. OF COMPONENTS.

304 HIGHEST REF. DESIG. USED ON THIS DWG

RES.	CAP.
R503	C501

305 THIS PRINT FOR MODEL 2081 APPLIES TO S/N 207 AND FOLLOWING. FOR MODEL 208 S/N 201 TO 206 REFER TO SD-1769-01.

306 THE FOLLOWING ITEMS ARE NOT FURNISHED IN MODEL 2082

RING GENERATOR (4871-012)
TONE GENERATOR (4871-307)
OPTION "X" PLUG (4233-001)
OPTION "Y" INTERRUPTER (4872-803)
F4, F5, FE AND F7 FUSES

7 | 8 | 9

TB7

TO FIG. 3
- AA 1 DT
- AB 2 BT
- AC 3 MRI
- AD 4 AC-DC AUD
- AE 5 RING GRD
- AF 6 120 IPM TB

TO FIG. 4
- AG 7 60 IPM BT
- AH 8 15 IPM GP
- AJ 9 30 IPM GP
- AK 10 60 IPM GP
- AL 11 120 IPM GP
- AM 12 FA2

TO FIG. 1
- AN 13 FA
- 14
- 15
- 16
- 17
- 18
- 19

TB5

TO FIG. 1 SHEET 2
- CF102 3 NC
- CF110 4 C
- CF106 5 NO
- CF103 6 NC
- CF111 7 C
- CF107 8 NO

REVISIONS

ECN NO.	CHKD BY / CHG SLIP NO.	DATE	DESCRIPTION		
8	15633	2-24-66			A
9	15857	4-13-66			
10	17773	7	SI AND RII ADDED		
11	18162	2-19-68	ADDED GRD, NOTE 306, AND MODEL 2082 TO PRINT. CORRECTED NOTE 305.		B
12	19447	11-18-69	"J" OPTION REMOVED		
13	20243	4-7-70	+ CONN OF RINGING AND TONE GEN AND INTERRUPTER CORRECTED		C
14	1833436	1-10-74	SPEC. 5377-001 ADDED		

D E F G H

SD-1769-02

ISSUE 11

DRAWN BY W. SEGERT	DATE 5-28-64	
CHECKED BY R. FABRIZIO	DATE 5-28-64	
APPROVED BY H. WESEBAUM	DATE 5-28-64	
APPROVED BY W. CHRISTIE	DATE 5-28-64	
RATING		

POWER UNIT
MODEL 2081 AND 2082

SD-5377-001
SD-5777-002

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LORAIN, OHIO
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DWG SIZE D

SHEET 1 OF 2

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7 | 8 | 9

FIG. 1

TB8
CF2 1 CF102
CF10 2 CF110
CF6 3 CF106
CF3 4 CF103
CF11 5 CF111
CF7 6 CF107
CF8 7
CF12 8
TO FIG. 1 SHEET 1
TO FIG. 1 SHEET 1

TO FIG. 1 SHEET 1
CF17 CF16 CF15

J2
21 20 R 19 A 18 A G 17 G 16 E 15 14 C 13 F 12 X 11 Z 10 Y 9 W 8 D,V 7 6 5 B 4 S 3 2 1

TO FIG. 1 SH. 1

K1
AA 13 AB 14 5 9 1 6 10 2 7 11 3 8 12 4
AA AB

R7 7500
R6 2250
R3 2500
CR6
R26 4000
R23 5000 CW
C7 100
K2 360

4865-713 SD-1760-01 A-1
CR103
R110 300
Q103
R106 47
CR105
R108 820
R109 1500
C101 0.1
Q104
R104 12,000
R107 1000
CR104
Q102
R103 470
R102 470
Q101
R101 12,000
CR102
R105 4700
CR101
POLARIZING NOTCH
C6 2000
R9 50

4337-011 SD-1787-01 A-3
R302 1000
CR302
C301 250
R301 3300
CR301
N ← POLARIZING NOTCH

TB6
K 1 R L 2 S M 3 N N 4 M
TO FIG. 1 SH. 1

4338-006 SD-1763-01 A-2
T201
R203 10
CR203
R204 10
R202 220
Q201
R205 3300
C202 50
R201 1000
C201 .047
CR202
CR201
POLARIZING NOTCH

T2
C5 50
R 1000
R4 125

4865-704 SD-1788-01 A-4
R402 1000
CR401
CR402
CR403
CR404
R401 2700
R403 10,000
CR405
R404 470
Q401
R405 10,000
C401 100
F ← POLARIZING NOTCH

CR17
R17 12

4336-010 SD-1789-01 A-5
POLARIZING NOTCH
CR501
CR503
R501 82
C501 100
R502 220
CR502
CR504
R503 560
CR505

SD-1769-C2
14

POWER UNIT MODEL 2081 AND 2082	SD-5377-001 SD-5777-002
LORAIN PRODUCTS DIVISION D	SHEET 2

SHEET INDEX

CONTENTS	SH NO	SD-DRAWING ISSUE AND T-DRAWING ISSUES AS FOLLOWS															
		SD DRAWING ISSUES															
		1-4	5	5	6	7	8	9	10	11	11	11	12	13	13	13	13
		T-DRAWING SHEET ISSUES															
SHEET INDEX MFG NOTES SD-T CROSS REF TABLE ENG NOTES RECORD OF CHANGES	1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
FIG. 1 MTG BASE	2	1	1	2	2	2	2	2	3	4	4	4	4	5	5	15	16
FIG. 2 OUTPUT MTG PNL	3	1	2	2	2	2	2	3	4	5	5	5	5	6	6	15	15
FIG. 3 SUB-ASSY PNL, REAR	3	1	2	2	2	2	2	3	4	5	5	5	5	6	6	15	15
FIG. 4 MTG BRACKET, REAR	4	1	1	1	2	2	3	3	3	4	4	5	5	5	5	15	16
FIG. 5 MTG CHASSIS, REAR	5	1	2	2	2	3	4	5	5	6	6	7	7	7	8	15	16
FIG. 6 INSTALLERS CONNECTIONS	6	1	1	1	1	1	2	3	3	4	5	5	5	6	6	15	15

SHEET INDEX NOTES

1. WHEN CHANGES ARE MADE IN THIS DRAWING, ONLY THOSE SHEETS EFFECTED WILL BE REISSUED
2. THIS SHEET INDEX WILL BE REISSUED AND BROUGHT UP TO DATE EACH TIME ANY SHEET OF THE DRAWING IS REISSUED, OR A NEW SHEET IS ADDED
3. THE ISSUE NUMBER ASSIGNED TO A CHANGED OR A NEW SHEET WILL BE THE SAME ISSUE NUMBER AS THAT OF THE SHEET INDEX
4. SHEETS THAT ARE NOT CHANGED WILL RETAIN THEIR EXISTING ISSUE NUMBER
5. THE LAST ISSUE NUMBER OF THE SHEET INDEX IS RECOGNIZED AS THE LATEST ISSUE NUMBER OF THE DRAWING AS A WHOLE

MANUFACTURING NOTES:

1. ALL WIRES SHALL BE 20 GA STRANDED UNLESS OTHERWISE SPECIFIED
2. WHEN ORDER CALLS FOR (Y) OPTION INTERRUPTER, OMIT (X) OPTION PLUG 2474-185 AND SUPPLY 3168-505 MARKER, REFER TO SHEET 3, FIG'S 2,3.
3. BI-TERMINAL NEAREST MOUNTING SURFACE.
4. (H1),(H2) - WIRES RUN THROUGH CORRESPONDINGLY DESIGNATED HOLES.
5. P- PAIR
6. PT- LEADS FURNISHED WITH COMPONENTS.
7. (2TW) - TWO WIRES SHALL BE TWISTED TOGETHER.
8. —●— SPLICE
9. UNLESS OTHERWISE SPECIFIED, RESISTANCE VALUES ARE IN OHMS, CAPACITANCE VALUES ARE IN MICROFARADS.
10. FUSES F4, F5, F6, F7 AND FUSE HOLDERS ARE NOT FURNISHED ON MODEL 20B2. INSULATE THE WIRES SEPARATELY WITH SLEEVING, PT NO. 1675-364, AND TY-RAP, PT NO. 2376-501. USE DOT FASTENERS, PT NO. 2375-661, TO COVER FUSE HOLDER HOLES ON MTG BASE.

ENGINEERING NOTES:

51. ASSOCIATED EQUIPMENT DRAWINGS:
    - J-1005-01
    - 4338-010
    - 4335-005
    - 4737-003
    - J-991-01
    - J-1000-11
    - T-1511-18
    - T-1665-03
    - T-1716-02

52. ASSOCIATED SCHEMATIC DRAWINGS:

SD-5777-002, SD-5377-001	POWER CIRCUITS
SD-1665-03	RINGING GENERATOR
SD-1716-02	TONE GENERATOR
SD-1511-18	INTERRUPTER
SD-1787-01	PRINTED CIRCUIT BOARD
SD-1788-01	" " "
SD-1789-01	" " "
SD-1760-01	" " "
SD-1763-01	" " "
SD-1761-01	" " "
SD-1823-06	" " "
SD-1823-07	" " "

53. THIS PRINT FOR MODEL 20B1 APPLIES TO S/N 207 AND FOLLOWING. FOR MODEL 20B1 S/N 201 TO 206 REFER TO T-1769-01.

REVISION NOTES: 12219
DWG ERRORS CORRECTED MACHINE MANUFACT. RED WITHOUT ERRORS. DWG ISSUE REMAINS THE SAME
(R10) 175YA REMOVED ON SHEET 2. WIRING OF (L1) PINS 3 AND 4 CHANGED.
(R14) PART NO. WAS 25BYA ON SHEET 3. WIRING OF (12) PIN 12 CHANGED.

REVISION NOTES: 12232
DWG ERRORS CORRECTED MACHINE MANUFACTURED WITHOUT ERRORS. DWG ISSUE REMAINS THE SAME.
MANUFACTURING NOTE 2 CORRECTED, SH 1.
W-BL WIRE OF F2 TO RECT ASSY WAS G, ON SH 2.
DELETE PIGTAIL COMPONENT INFO, WIRING OF (D1),(D2),(10), & (12) CORRECTED ON SH 3.
WIRING OF (03) CORRECTED ON SH 4.
WIRING OF (00),(03),(04) CORRECTED ON SH 5.

REVISION NOTES: ISS. 2 12950
WIRING OF 103R CONNECTORS CORRECTED ON SHEET 3; JUMPER ADDED ON A4 PLUG BETWEEN PINS E AND H

REVISION NOTES: ISS. 3 15411
ERROR CORRECTED, POSITION 216

REV NOTES: ISS 4 WIRE COLORS CHG'D AT LOC 05, SH.4

REVISION NOTES: ISS.5, ADDED R17 AND CR17 AT LOC 07 SH.5

REVISION NOTE: ISS. 6 W-G WIRE ON CR6 ANODE AT LOC 00 SH. 4 MOVED TO A5 PIN S AT LOC 04 SH. 5. OPTIONS (J) AND (K) ADDED.
REMOVED SD,T CROSS REF. TABLE
REMOVED RECORD OF CHANGES TABLE
UNUSED WIRES REMOVED FROM K1 & K3

REVISION NOTES: ISS 7 TB5 TERMS 3-8 WERE 1-6 AT LOC 308 T2 WIRING ON TERMS 5 AND 6 REVERSED AT LOC 501

REVISION NOTES: ISS 8 R11 AND S1 ADDED

REVISION NOTES: ISS 9 ADDED NOTE 10, LOC 200, LOC 300-1 AND MODEL 20B2. CORRECTED NOTE 53. ADDED GRD TO SHEET 6.

REVISION NOTES: ISS 10 CORRECTIONS ON SHEET 6: TB3, TB5, TABLE "A", NOTES 1, 3, 4 AND 6.

REVISION NOTES: ISS 11 WIRE COLORS CHGD. ON SHEETS 4 AND 5.

REVISION NOTES: ISS 12 "V" OPTION REMOVED

REVISION NOTES: ISS 13 RED WIRE GOING TO 311 ON 206 WAS CONNECTED TO 202.

REVISION NOTES: ISS 14 3876-319 WAS 2475-747 ON SHEET 5

REVISION NOTES: ISS 15
2565-628 WAS 2565-621 AT LOC 404 AND 405, T-5377-001 ADDED.

REVISION NOTES: ISS 16 PART NO UPDATED LOC 216 CR6 WAS 2812-121 LOC 400 CR17 WAS 2812-222 LOC 507

2	12950	12-15-64		
3	15411			
4	15163			
5	15619	1-5-66		
6	15633	2-23-66		
7	15857	4-14-66		
8	17773	7-21-67		
9	18182	2-19-68		
10	18185	3-18-68		
11	19184	6-4-69		
12	19447	11-19-69		
13	20243	4-7-70		
14	1830169	10-6-70		
15	1833436	9-28-73		
16	1834574	10/22/74		

WAS T-1769-02

POWER UNIT
MODEL 20B1
AND 20B2

5-28-64
5-27-69

T-5377-001
T 5777 002

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D

SHEET 1 OF 6

FIG. 1 MTG BASE

TOP

00
GROUND
2156-408
WELD STUD
WASHER

01
(L1)
4432-511
CHOKE
1 2 3 4
PT
SPLICE
#6 LUG BARREL
(ISO) VINYL
GLASS SLV
16 12 GA (C1) 02
3/2 W-BL
3/2 W-G BR

02
(C11)
2731-324
8500
(C12)
2731-324
8500
12 GA
D
(C10)
2731-324
8500
(C13)
2731-324
8500
BK (L2 START) 12 GA 2 01
(L1 FINISH)
1+1 12 GA (L2 FINISH) 12 GA 101
D
PT 08 04 16,302 01 301 12 GA 04 05 PT

03
SPLICE
#6 LUG BARREL
(ISO) VINYL
GLASS SLEEVING
(T1)
4441-306
PWR
XMFR
300 12 GA 1
304 2
304 3
PT
4
5
16
16
PT

07-2 07-2, 3/2 07-1, 15 07-1, 14

07-1
(S1)
2513-126
SPST
W-G-BK
R
2

07-2
2 W-G-BK
R
2
D
(R11)
2683-258
750

04
(L2)
4415-011
CHOKE
1 2
PT
02 02

05
(M2)
2923-210
0-30 AMP
AMMETER
+
D
12 GA
310 02

06
(M1)
2943-211
0-80 VOLT
VOLTMETER
(C2) +
PT
R
BK
301, 311 301

07
(CB1)
2567-068
25 AMP
1
D
12 GA
300 304

NOTE 10

08
(F5)
2488-959 HLR
2486-202 1/4A
FUSE
D

09
(F4)
2488-959 HLR
2486-208 1 3/4A
FUSE

NOTE 10

10
(F3)
2488-959 HLR
2486-208 1 3/4A
FUSE

11
(F2)
2488-106 HLR
2483-222 1A
FUSE

12
(F7)
2488-959 HLR
2486-208 1 3/4A
FUSE

13
(F6)
2488-959 HLR
2486-208 1 3/4A
FUSE

NOTE 10

14
(R2)
2683-255
500

15
(R1)
2652-340
5000

16
4737-003
RECT ASS'Y
G G AC AC
2TW
2TW
PT
12 GA
D

PIGTAIL COMPONENT INFORMATION				
REF DESIG	L.P.C. PT. NO.	IN & 2N NO'S	VALUE	LOCATION NO.
C2	2715-272		LO	06

POWER UNIT MODEL 20B1 AND 20B2	T-5377-001 T-5777-002
LORAIN PRODUCTS CORPORATION D	SHEET 2 OF 6

FIG. 2 OUTPUT MTG PNL

001 TOP

GROUND
2456-108 LUG
2156-406
WASHER

00 TB1
2462-313 CONT
2462-315 END
AC NEUT
HI
2448-228 BUSHING
HI
D
12 GA
207 203

01 TB2
2462-313 CONT
2462-315 END
3461-101 (2)
NEG POS
BK 2 BK
12 GA
D
07 212,206 10
02,202 07 206

02 (R14)
2682-202
.07
D
12 GA
01 202 03

03 (R12)
2656-610
100
H2
2448-223 BUSHING
BK
02,12 2 W-O-BR

04 TB4
2462-313 CONT
2462-315 END
A PT
207 12 GA D
H3
H3
2448-223 BUSHING
110V
120V
LEAD #2 203
LEAD #3 203

07 TB3
2463-106
D
12 R 1 R 01
215 BK 2 BK 01
12 W-BR 3
12 G 4
12 BL 5
12 O 6

08 TB5
2463-106
13 BL 3
13 R 4
13 O 5
13 G 6
13 BR 7
13 BK 8

09 TB7
2463-119
3168-505 MARKER ⓨ OPTION
ⓧ MFR NOTE 2
BK 14
W-R-G 15
BL 15
G 11
R 14
W-R-BL 15
W-BR-BK 15
BR 15
W-G 15
W-O-BR 15
W-O-BK 15
W-BK 212
W 210

10 (F1)
2488-256
FUSE BLK
2488-442
25A FUSE
210 01
BK D 12 GA
210 BR
205 H4 12 GA D
H4
2448-223 BUSHING

ⓧ MFR NOTE 2
2474-185
PLUG
D
D

FIG. 3
SUB-ASSEMBLY PNL
REAR

11 2475-122
4 CONT SOC
2 G
2 G
2 R
2 BL
212,15 09,15 206,14 209

12 2475-181
21 CONT SOC
07 R
07 BL
07 W-BR
201 W-G-BR
201 W-BL
211 W-G
6 5 4 W-BR-BK 214
9 8 7 BK 215
12 11 10 O 07
G 07
15 14 13 R 207-1
18 17 16 W-R 216
21 20 19 W-O-BR 03

13 CONTROL ASS'Y
4865-706
TB6
2463-264 TERM. BLOCK
3163 109 MARKER
TB8
2463-268 TERM. BLOCK
3166-123 MARKER
BR W-BR BL W-BL
2TW 2TW
216 216 216 216
BL R O G BR BK
08 08 08 08 08 08

14 2475-142
8 CONT SOC
208 G
09 BK
15 W-R-O
15 W-BK
2 R 15,11
D
R 09
W-R 15

15 2475-181
21 CONT SOC
14 W-BK
213 W-BL
11 G
11 O
09 W-R-BL
09 W-O-BR
09 W-G
6 5 4 W-R 14
W-R-O 14
9 8 7 BL 09
12 11 10 W-BR-BK 09
W-R-G 09
15 14 13 BR 09
18 17 16 W-O-BK 09
21 20 19
R 14

BOTTOM

DRAWING ISSUE	
1	
2	
3	
4	
5	
6	
15	

ISSUE 15

POWER UNIT
MODEL 20B1
AND 20B2

T-5377-001
T-5777-002

LORAIN PRODUCTS CORPORATION

SIZE D

SHEET 3 OF 6

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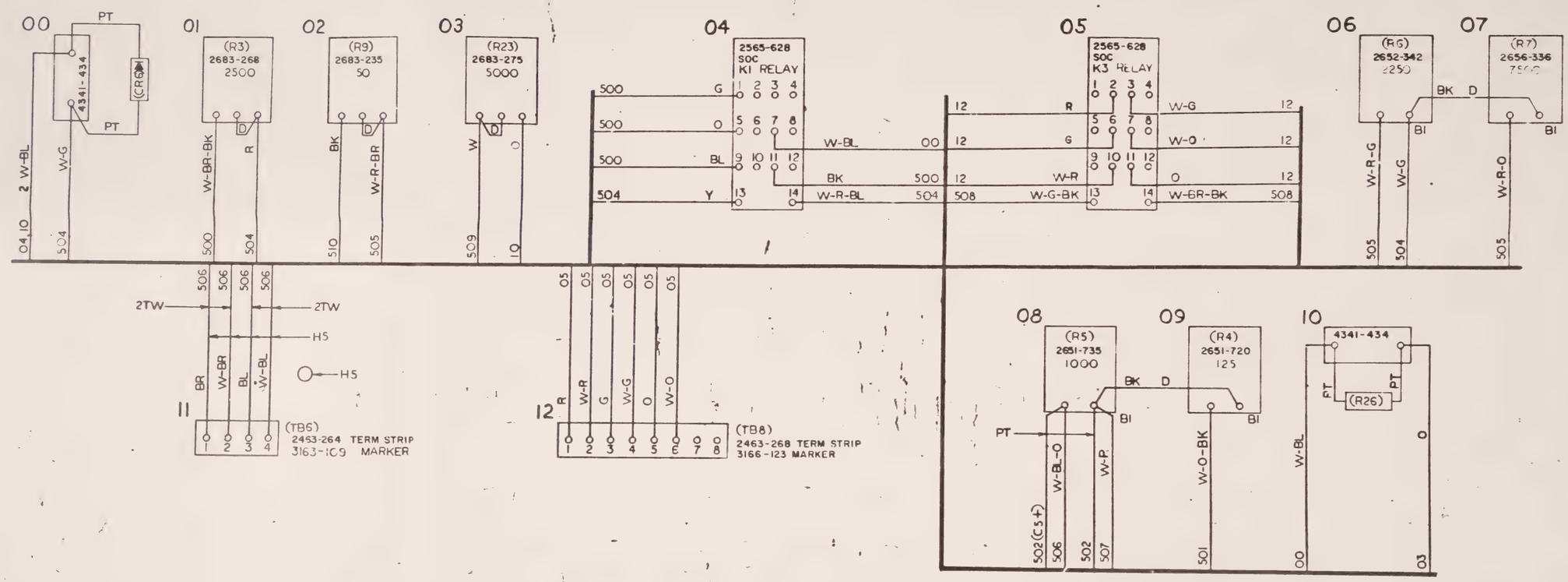
LP433

BOTTOM

FIG. 4
MOUNTING BRACKET, REAR



PIGTAIL COMPONENT INFORMATION				
REF DESIGN	L P C PT NO		VALUE	LOCATION NO
CR6	2812-223			00
R26	2651-347		4700	10

DRAWING ISSUE
1
2
3
4
5
15
16

ISSUE 1

POWER UNIT
MODEL 2081 AND 2082

T-5377-001
T-5777-002

LORAIN PRODUCTS CORPORATION

DWG SIZE D

SHEET 4 OF 6

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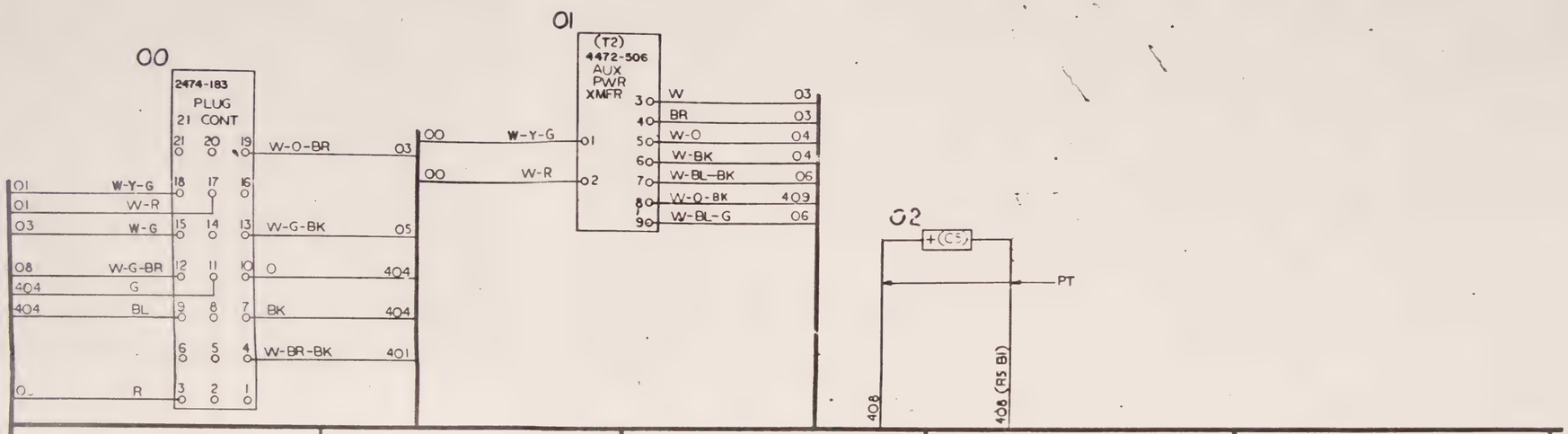
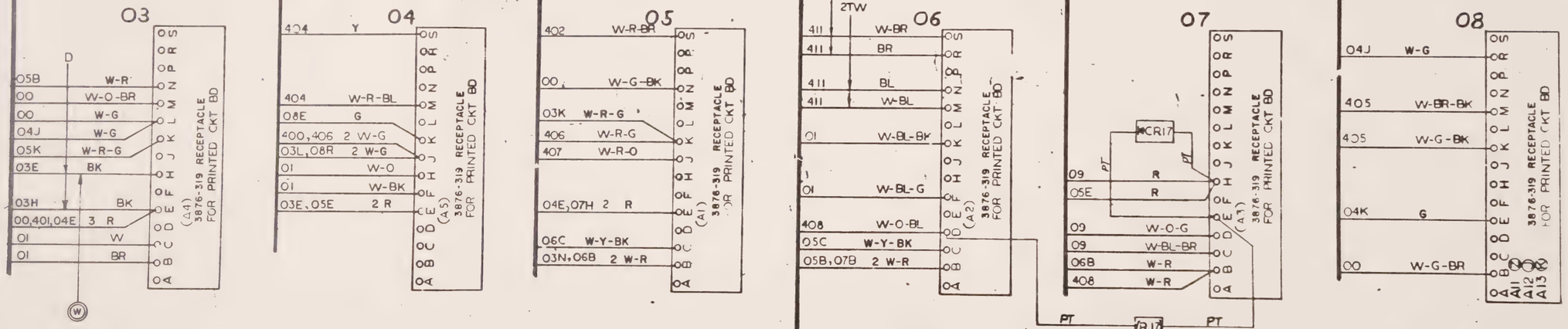
TOP

FIG. 5
MTG CHASSIS



BOTTOM

MTG CHASSIS, REAR



PIGTAIL COMPONENT INFORMATION

REF DESIGN	L.P.C. PT. NO.		VALUE	LOCATION NO
C5	2731-133		50	02
C7	2731-144		100	09
C6	2731-264		2000	10
CR17	2812-223			07
R17	2615-217		12	07

DRAWING ISSUE

1	
2	
3	
4	
5	
6	
7	
8	
15	
16	

ISSUE

POWER UNIT
MODEL 2081 AND 2082

T-5377-001
T-5777-002

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DWG SIZE D

SHEET 5 OF 16

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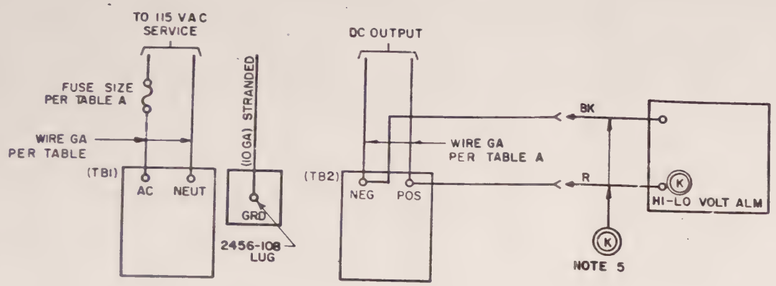
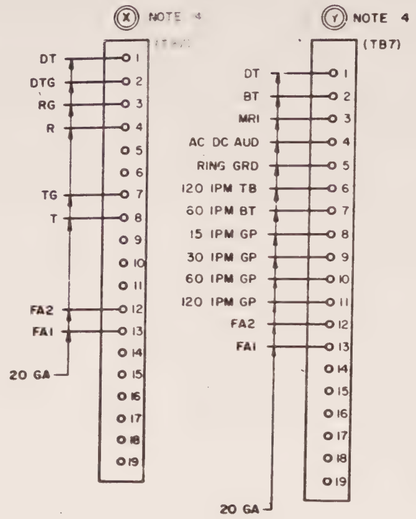
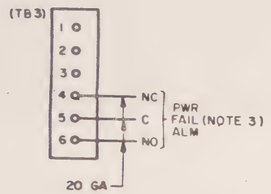
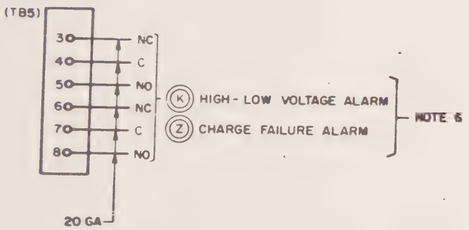
FIG. 6









NOTES:

1. DC OUTPUT WIRE SIZE IS BASED ON 1 VOLT DROP AT MAXIMUM RATED OUTPUT FOR LOOP LENGTHS SHOWN IN TABLE "A". FOR LOOP LENGTHS UP TO 50 FEET USE WIRE SIZE SHOWN FOR 50' LOOP. THE LOOP LENGTH IS THE SUM OF THE LENGTHS OF THE POSITIVE AND NEGATIVE LEADS.
2. RATINGS SHOWN FOR AC INPUT WIRES ARE FOR RUBBER INSULATED WIRES PER NATIONAL ELECTRIC CODE TABLE 310-12 COL 2, BASED ON 30°C (86°F) AMBIENT; FOR HIGHER AMBIENT TEMPERATURES USE WIRES WITH HIGHER OPERATING TEMPERATURE OR DERATE WIRES PER NATIONAL ELECTRIC CODE TABLE 310-12.
3. POWER FAILURE IS INDICATED BY A CLOSED CIRCUIT BETWEEN TERMINALS 4 AND 5 AND AN OPEN CIRCUIT BETWEEN TERMINALS 5 AND 6 OF TERMINAL STRIP TB3.
4. ON MODEL 2081: USE "Y" OPTION WHEN INTERRUPTER IS SUPPLIED AS ACCESSORY. USE "X" OPTION WHEN PLUG IS SUPPLIED IN PLACE OF INTERRUPTER. ON MODEL 2082 "X" AND "Y" OPTION IS NOT USED.
5. WHEN OPTION "K" IS USED, THESE JUMPERS MUST BE CONNECTED AS SHOWN.
6. IF OPTION "K" OR "Z" IS PROVIDED, AN ALARM IS INDICATED BY AN OPEN CURCUIT BETWEEN TERMINALS 4 TO 5 AND 7 TO 8, AND BY A CLOSED CIRCUIT BETWEEN TERMINALS 3 TO 4 AND 6 TO 7 OF TERMINAL STRIP TB5.

TABLE "A"

AC INPUT					DC OUTPUT							
VOLTS	FREQ HERTZ	FUSE AMPS	WIRE GA	LUG CAPACITY	WIRE GA FOR LOOP LENGTH IN FT							LUG CAPACITY
					50	60	80	100	120	160	200	
115	60	30	10	14-4	10	8	8	6	6	4	4	14-4

INSTALLER'S CONNECTIONS FOR 2081 AND 2082 POWER UNIT	T-5377-001 T-5777-002
LORAIN PRODUCTS CORPORATION — DWG SIZE D	SHEET 6 OF 6
PRINTED IN U.S.A.	ISSUE 15

FIG. 1
TIMING CIRCUIT

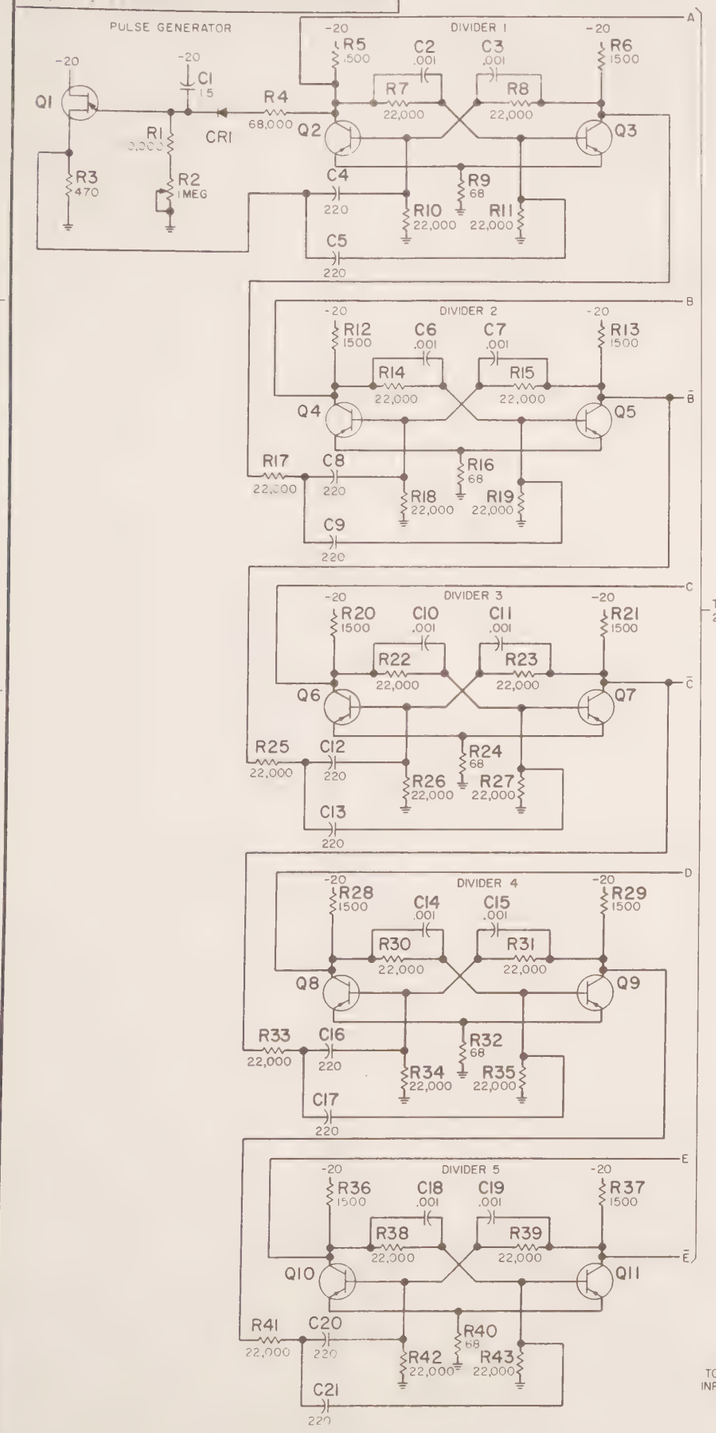


FIG. 2
GROUND PULSE OUTPUTS

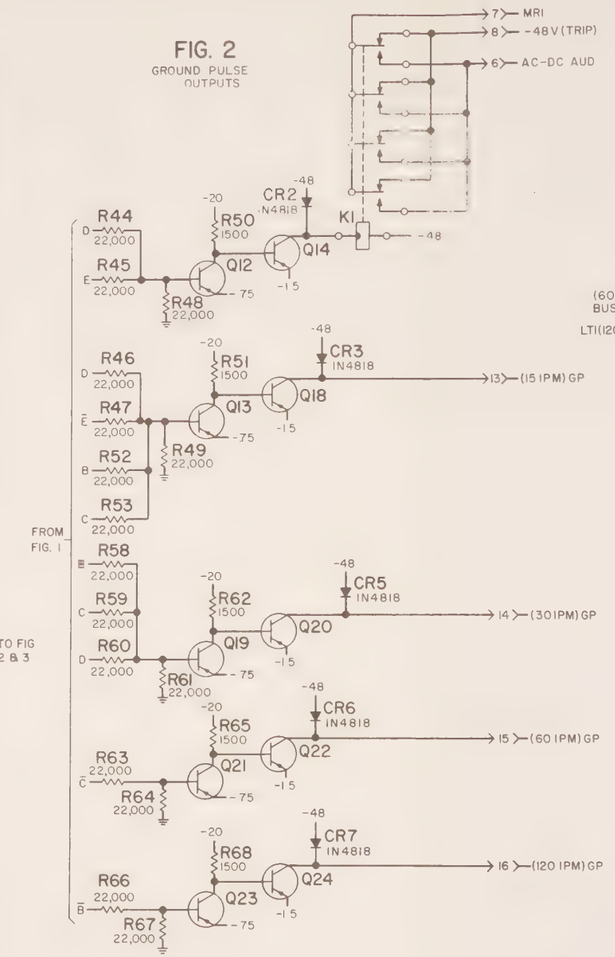


FIG. 3
TONE GATE

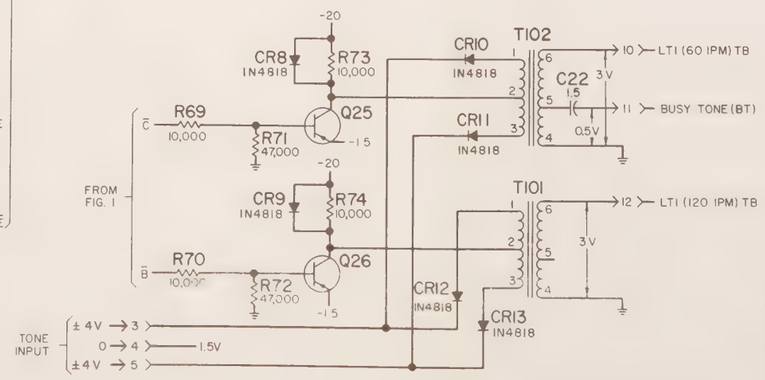


FIG. 5

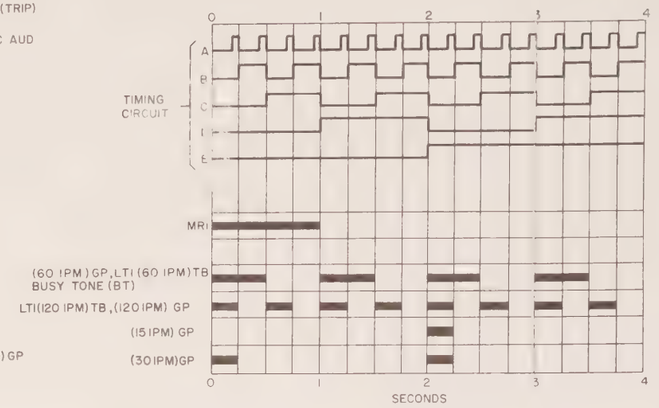
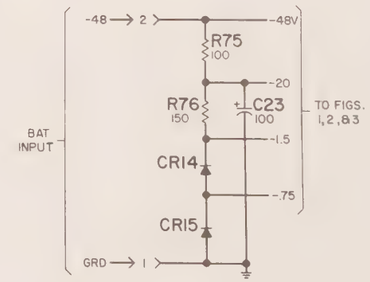


FIG. 4



REVISIONS			
ZONE	SYMBOL	DESCRIPTION	DATE
	ISS 1	NEW	3-11-64
	ISS 2	CR2, 3, 5-13 WERE IN537 19159	11-3-69

LIST OF MATERIAL

QUAN	ITEM	LPC PART NO	MFR PART NO	MFR CODE NO	DESCRIPTION	MAT

FOR MFG SPEC SEE — CLASSIFICATION

SD-1511-18 — D SIZE

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCE ON
FRACTIONS .32 DECIMALS .015 ANGLES 1.5
MATERIAL
FINISH
HEAT TREAT

DRAWN D PRY 3-11-64
CHECKED
ENGINEER 3-16-67
APPROVED
APPROVED

NEXT ASSY — USED ON — APPLICATION

SCHEMATIC DIAGRAM FOR INTERRUPTER ASSY 4872-803

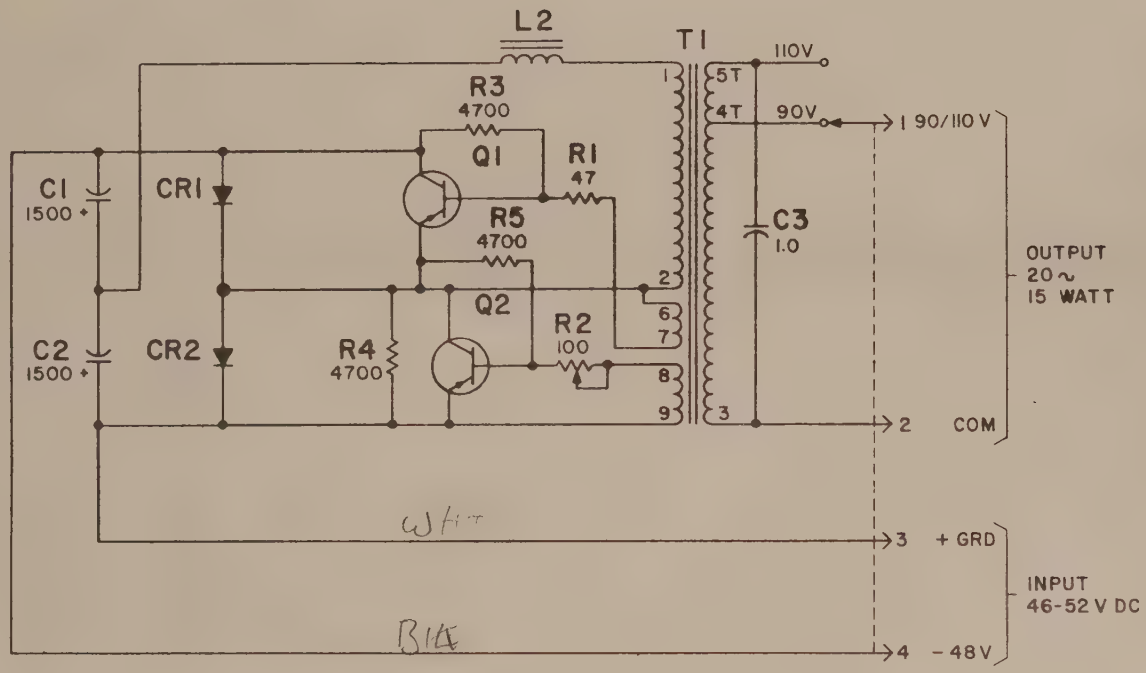
LORAIN Products Corporation
LORAIN, OHIO
LORAIN PRODUCTS (CANADA) LTD
ST. THOMAS, ONTARIO

SD-4872-803

SHEET 1 OF 1

SD-4871-012

SS	CHANGE LTR NO	BY	DATE
1			3-5-64 NEW
2	12205		7-7-64 R2 WAS 47Ω 1/2 W FIXED
3	1834155		3-29-74 C4 AND C5 DELETED



WAS SD-1665-03

SCHEMATIC DIAGRAM
FOR
4871-012
TRANSISTOR RING. GEN

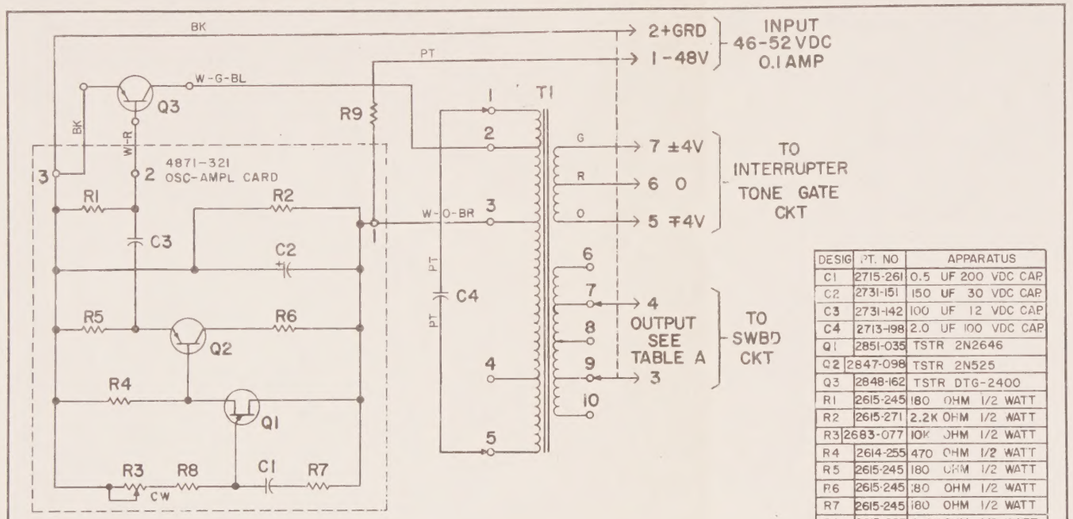
LORAIN Products Corporation
LORAIN, OHIO
AND
LORAIN PRODUCTS (CANADA) LTD ST THOMAS, ONTARIO

DR. BY P Sager	DATE 3-5-64	SCALE
CH BY R Fabrizio	DATE 3-7-64	PART NO
CH BY [illegible]	DATE 3-11-64	SD-4871-012
APP. BY [illegible]	DATE 3-16-64	

TRIM LINES

F4A & 4871-307 DIAL TONE GENERATOR (100 MW)

ISS. 8



DESIG	PT. NO	APPARATUS
C1	2715-261	0.5 UF 200 VDC CAP
C2	2731-151	150 UF 30 VDC CAP
C3	2731-142	100 UF 12 VDC CAP
C4	2713-198	2.0 UF 100 VDC CAP
Q1	2851-035	TSTR 2N2646
Q2	2847-098	TSTR 2N525
Q3	2848-162	TSTR DTG-2400
R1	2615-245	180 OHM 1/2 WATT
R2	2615-271	2.2K OHM 1/2 WATT
R3	2683-077	10K OHM 1/2 WATT
R4	2614-255	470 OHM 1/2 WATT
R5	2615-245	180 OHM 1/2 WATT
R6	2615-245	180 OHM 1/2 WATT
R7	2615-245	180 OHM 1/2 WATT
R8	2615-283	6.8K OHM 1/2 WATT
R9	2651-526	300 OHM 6.5 WATT
T1	4467-517	OUTPUT TRANS

TABLE A									
OUTPUT VOLTAGE ADJUSTMENT									
VOLTS	0.5	1.0	1.5	3	4	4.5	6	10	
TERM	6,7	7,8	6,8	8,9	7,9	6,9	9,10	7,10	

LORAIN PRODUCTS CORPORATION
LORAIN, OHIO
LORAIN PRODUCTS (CANADA) LTD, ST. THOMAS, ONTARIO

LABEL PT. NO. 3196-006

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REDUCE TO 3 1/4 IN

NOTE
101 MATL: FASSON, PERMANENT TYPE WHITE PRESSURE SENSITIVE PAPER STANDARD SIZE SHEET 17 × 22

FORMERLY SD-1716-02

DWG ISS	CHG NO	DATE	DRAWN BY	APP BY
1				
2	15020	8-26-65		
3	14740	10-1-65		
4	15411	11-1-65		
5	14763	12-2-65		

6 17016 6 4871-321 WAS
E. Pieton 28 4872-403
12-27-67 68
W. A. Mende
A.J.J. 7-16-68

7 19161 3 TI WAS 4467-516.
J. Pieton 19
W. A. Mende 69
3-25-69
C. Tech 2-26-69

8 1832518 2 R9 PT NO WAS
G. Reese 15 2651-725
C. T. Clark 73
2-16-73

FORMERLY PT NO. 254TA

ISSUE

CIRCUIT LABEL
FOR
F4A & 4871-307
DIAL TONE GENERATOR (100MW)

DRAWN BY E. Pratt	DATE 4-7-65
CHECKED BY G. Parker	DATE 4-15-65
APPROVED BY R. Wilder	DATE 4-20-65
APPROVED BY W. Hammell	DATE 5-4-65
RATING	STANDARD
	SD-5114-003 SD-4871-307 3196-006

LORAIN PRODUCTS CORPORATION
LORAIN, OHIO
LORAIN PRODUCTS (CANADA) LTD., ST. THOMAS ONTARIO

DWG SIZE D

SHEET 1 OF 1

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